Fluor Hanford
Groundwater Remediation Project

Overview: Autumn 2005


Contaminated reactor effluent seeps into soil, 100-K Area, 1960s


Contaminated pond, 200-East Area, 1960s


Drilling wells to monitor and extract Hanford's groundwater, 2005

Fifty years of plutonium-production operations put approximately 450 billion gallons of liquid wastes into the soil of the 560-square mile Hanford Site. The liquid releases included chemicals used in manufacturing and rinsing uranium fuel, laboratory experiments, dissolving fuel after it was irradiated in Hanford's nuclear reactors, and liquefying plutonium scraps needed to feed other operations. Chemicals were also added to the water that cooled Hanford's reactors, to prevent corrosion in the reactor tubes. In addition, water and acid rinses were used to clean radionuclide deposits from piping in Hanford's large radiochemical facilities. All of these chemicals became contaminated with radionuclides.

As Hanford raced to help win World War II, and then produce materials for the Cold War, these radioactive wastes were disposed to the Site's sandy soils. Some early scientific experiments showed that the most highly radioactive components of these liquids would bind to the soil closest to, and just below, the land surface, thereby posing no threat to groundwater. Other experiments predicted that the water containing most radionuclides would take hundreds of years to seep into groundwater, decaying (or losing) most of its radioactivity before reaching the groundwater or subsequently flowing into the Columbia River.

Yet, clear evidence today demonstrates that many contaminants have reached the groundwater and the Columbia River, with more en route. Currently, over 100 square miles of groundwater on the Hanford Site have contaminant levels above drinking-water standards.

The Challenge

In 1998, the Groundwater Remediation Project (GRP) was established as Hanford's newest major cleanup endeavor. Now managed by Fluor Hanford, it is a cross-cutting project that works with scientists from Pacific Northwest National Laboratory and other Site contractors and subcontractors to understand and remediate contamination plumes that could affect the Columbia River.

The Groundwater Remediation Project has four major tasks: shrink the footprint of contaminated areas; reduce "recharge" (or re-supply) of clean or contaminated water that may drive soil contaminants deeper into the subsurface; implement final groundwater remedies; and integrate groundwater monitoring needs. To accomplish these tasks, GRP operates seven major pump-and-treat systems at key locations on the Hanford Site where concentrated plumes of contamination can be intercepted and cleaned. The project also manages test systems in the 100-D and 100-K Areas that apply new approaches to chemically alter the contaminants in groundwater.

In addition, GRP decommissions old wells that are preferential pathways for contaminants to move into groundwater; and drills new monitoring, extraction and injection wells. Extensive monitoring programs, underground mapping, records searches, and investigations of new technologies to provide better remedies for groundwater contamination are also vital parts of GRP.

Accomplishments

Decommissioned and sealed over 250 old wells, October 2005

- **Program prevents old wells from being a passageway for contaminants entering the groundwater**

Modified treatment facilities to improve regeneration capacity in 100 D Area, September 2005

- **Remediating concentrated chromium+6 plume**

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Fluor Hanford
Groundwater Remediation Project

Completed drilling all required new wells for calendar year 2005, August 2005

- Met TPA milestone
- Have now drilled 8 of FY 06 wells

Started up treatability test for new groundwater remediation system in 100-K Area, June 2005

- 100-KR-4 system changes detrimental chromium-6 to harmless chromium-3 in groundwater

Started up four new extraction wells in 200-West Area to remediate carbon tetrachloride plume, June 2005

- 200-ZP-1-2 wells expanded cleanup flow rate by 50 percent

What's Next

- Re-line three aging water lines in U-Plant area, to prevent "re-charge" of water to drive contaminants down to groundwater, Fall 2005
- Shut down pump-and-treat system in 100-H area, after successfully remediating plume of chromium-6 in groundwater, 2006
- Install new treatment barrier in 100-N Area to fix SR-90 in place, Winter 2005 - 2006
- Report on integrated assessment of technetium-99 plume in T Tank Farm Area, FY 2006
- Drill 15 more new wells, FY 2006
- Install new pump-and-treat systmes in KW reactor area, 2006-2007

GROUNDWATER REMEDIATION PROJECT

Our Goal Is Zero Accidents!